FIG. 1

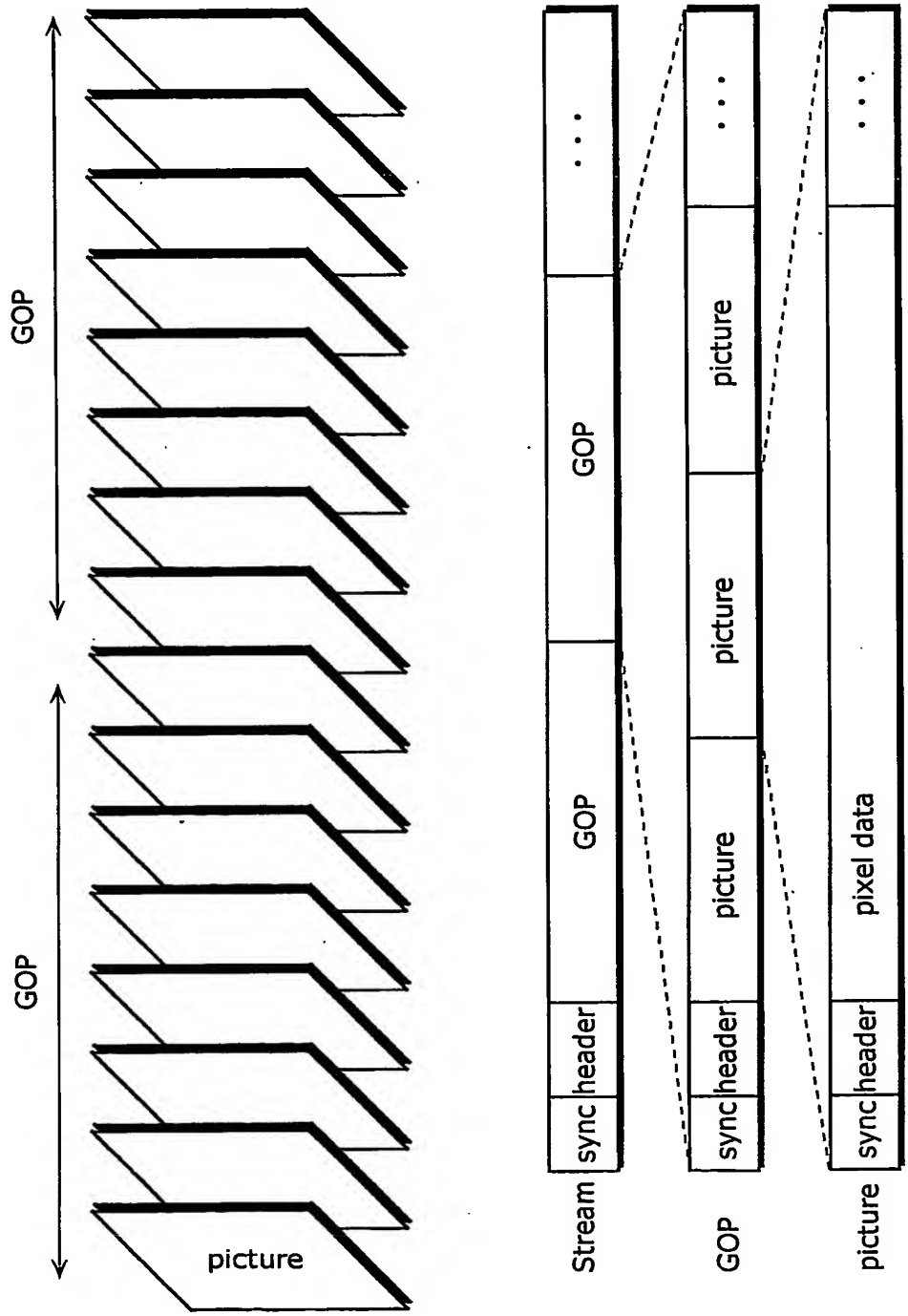

GOP
GOP
picture
Stream
sync
header
GOP
GOP
. . .
GOP
sync
header
picture
picture
picture
. . .
picture
sync
header
pixel data
. . .

FIG. 2A

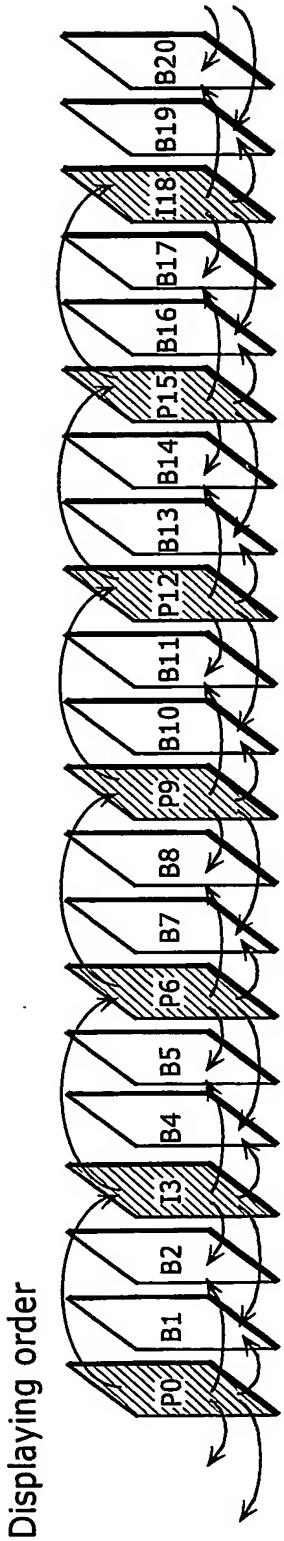

Displaying order
P0
B1
B2
I3
B4
B5
P6
B7
B8
P9
B10
B11
P12
B13
B14
P15
B16
B17
I18
B19
B20

FIG. 2B

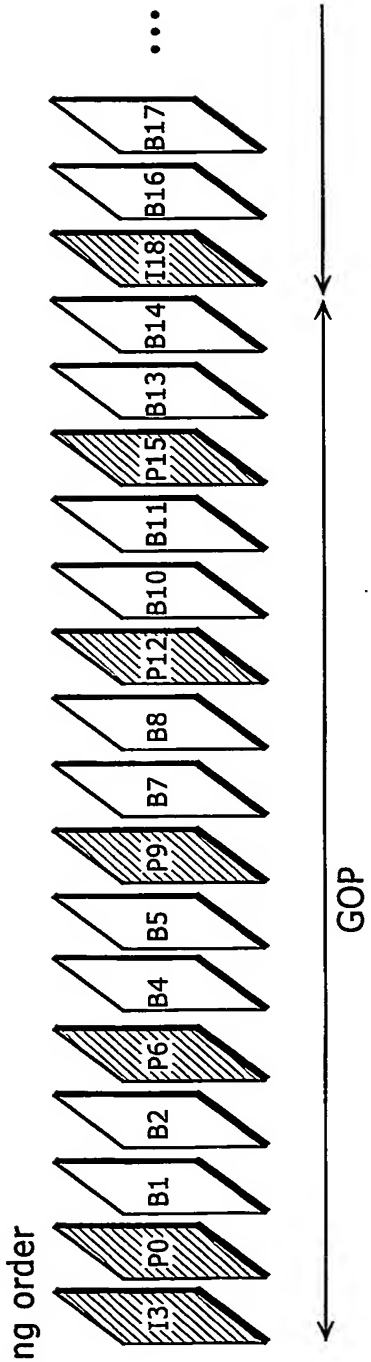

Decoding order
I3
P0
B1
B2
P6
B4
B5
P9
B7
B8
P12
B10
B11
P15
B13
B14
I18
B16
B17
...
GOP

FIG. 3

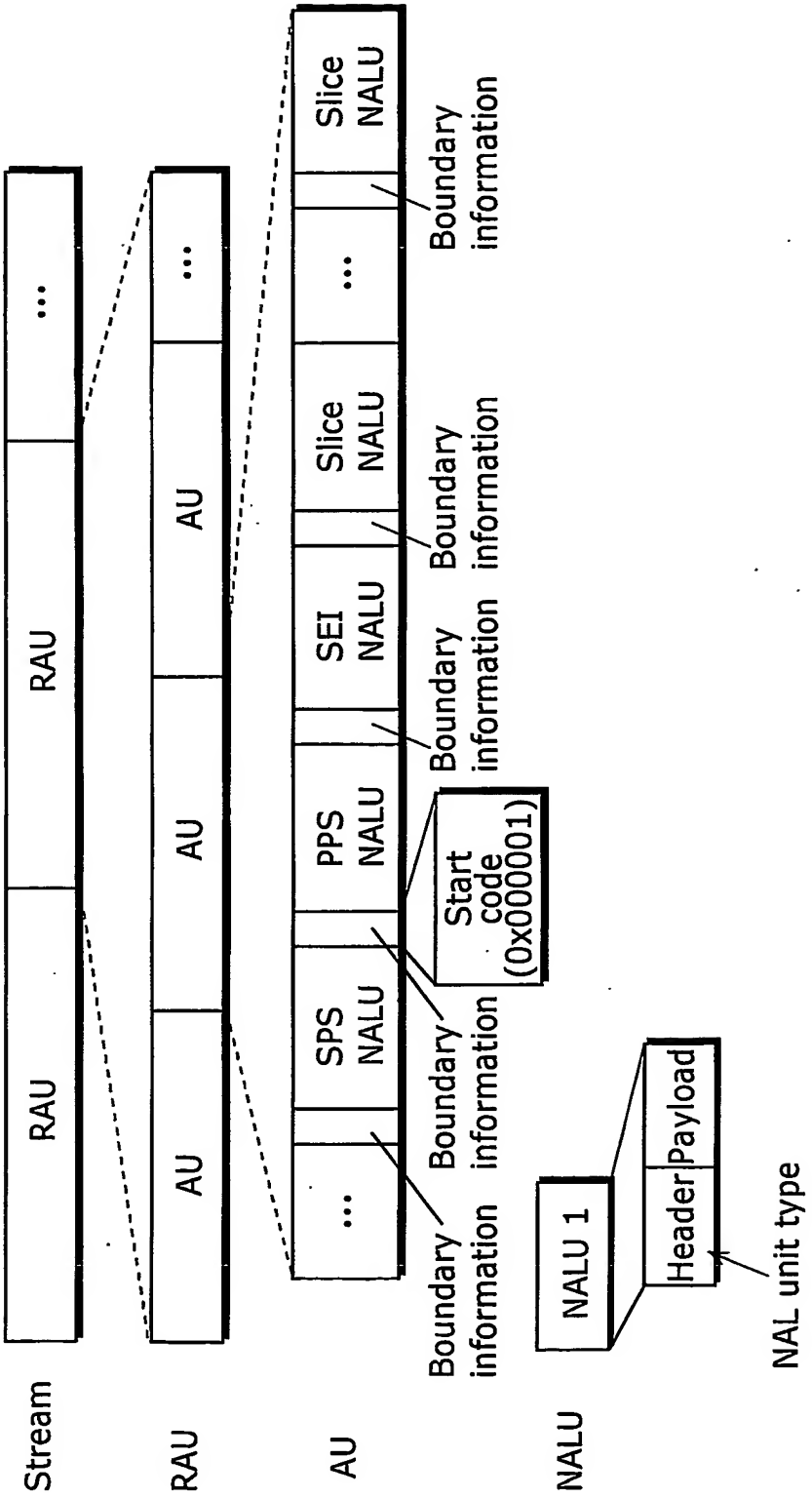

Stream
RAU
AU
NALU
RAU
...
AU
AU
...
SPS NALU
PPS NALU
SEI NALU
Slice NALU
...
Slice NALU
Boundary information
Start code (0x000001)
NALU 1
Header
Payload
NAL unit type

FIG. 4

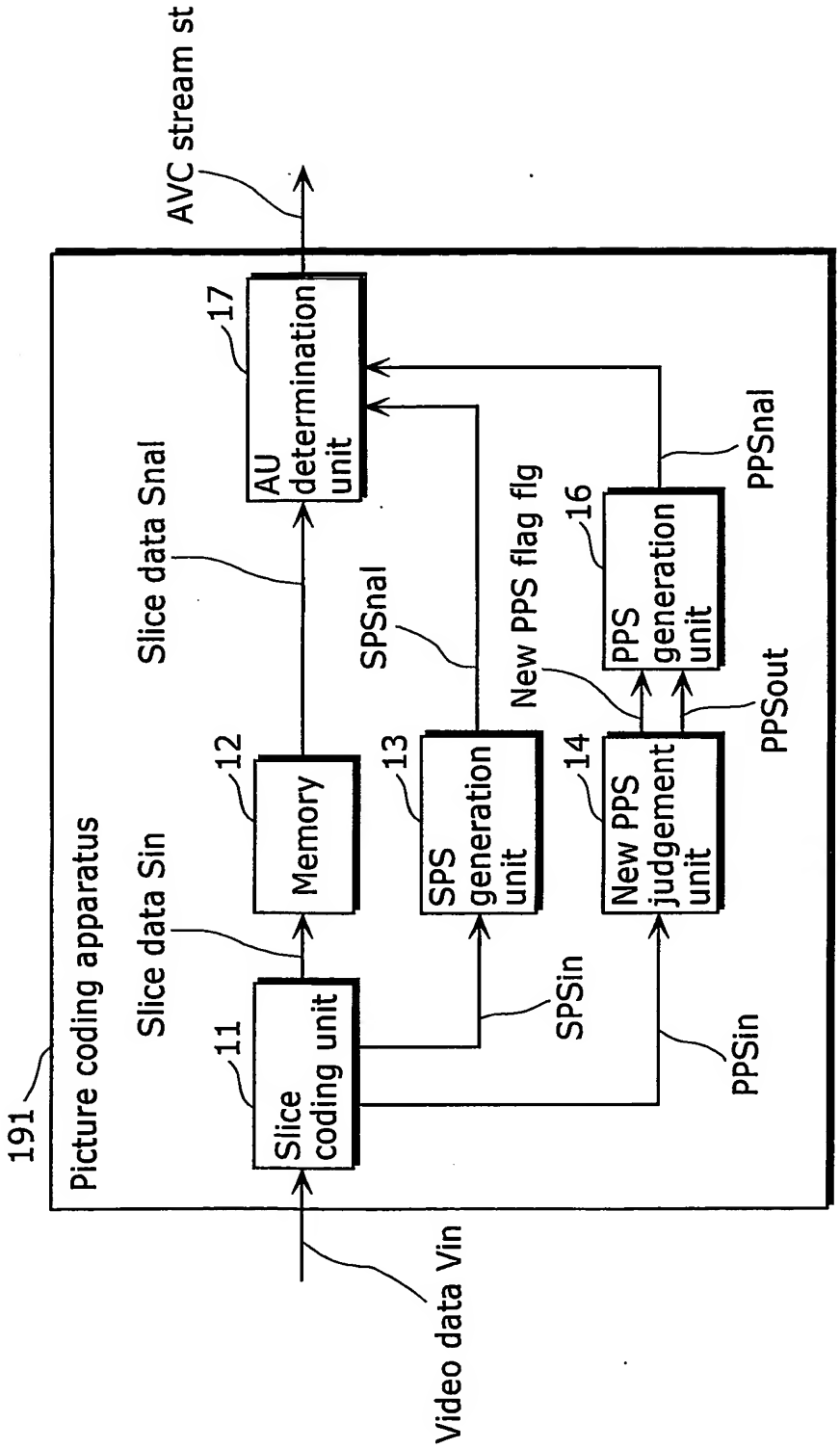

AVC stream st
17
AU determination unit
Slice data Snal
16
PPS generation unit
PPSnal
SPSnal
New PPS flag flg
PPSout
12
Memory
13
SPS generation unit
14
New PPS judgement unit
Slice data Sin
SPSin
PPSin
11
Slice coding unit
191
Picture coding apparatus
Video data Vin

FIG. 5

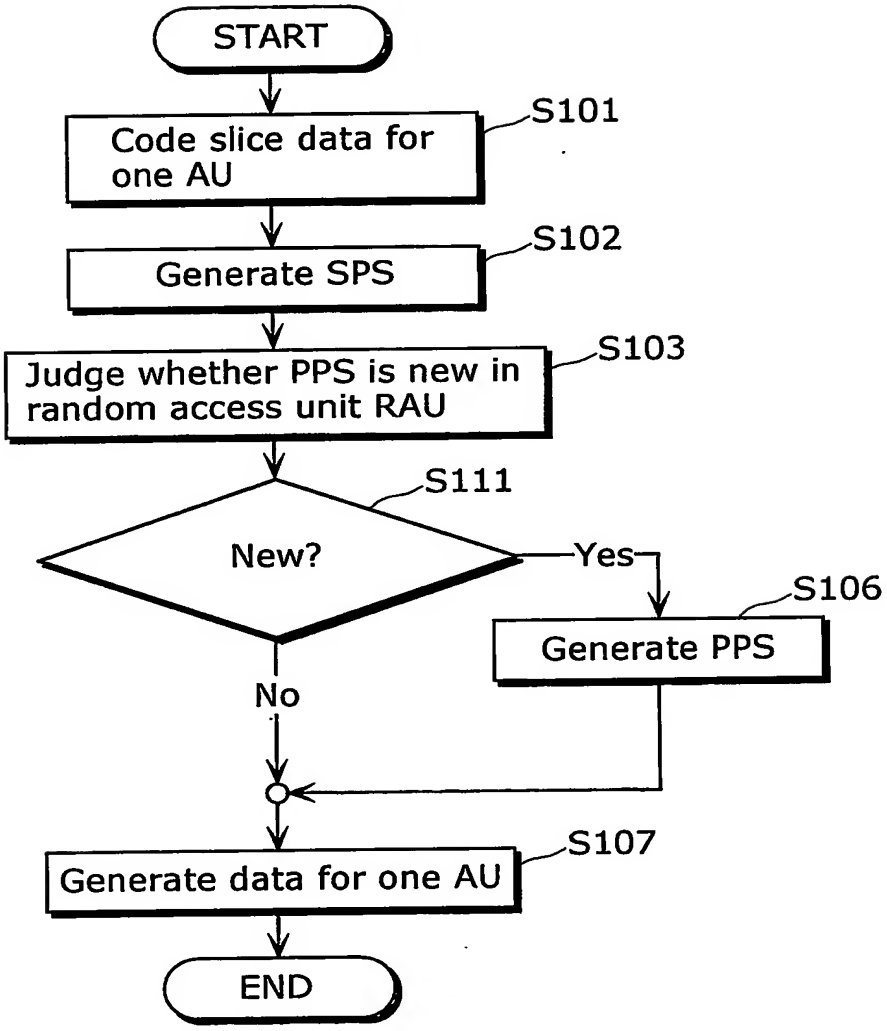
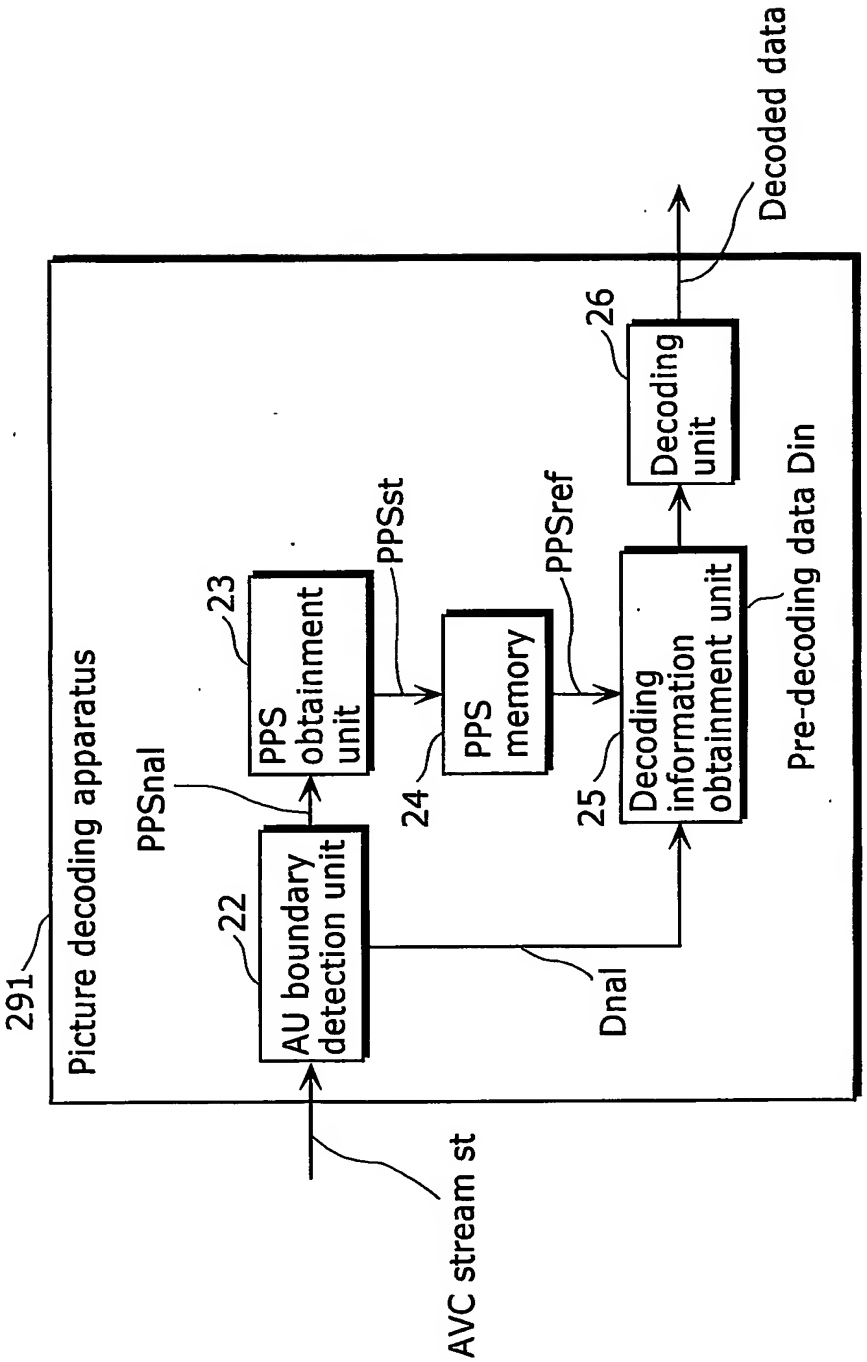

START
Code slice data for one AU
S101
Generate SPS
S102
Judge whether PPS is new in random access unit RAU
S103
New?
S111
Yes
Generate PPS
S106
No
Generate data for one AU
S107
END

FIG. 6


Picture decoding apparatus
291
AVC stream st
22
AU boundary detection unit
PPSnal
23
PPS obtainment unit
PPSst
24
PPS memory
PPSref
25
Decoding information obtainment unit
Dnal
26
Decoding unit
Decoded data
Pre-decoding data Din

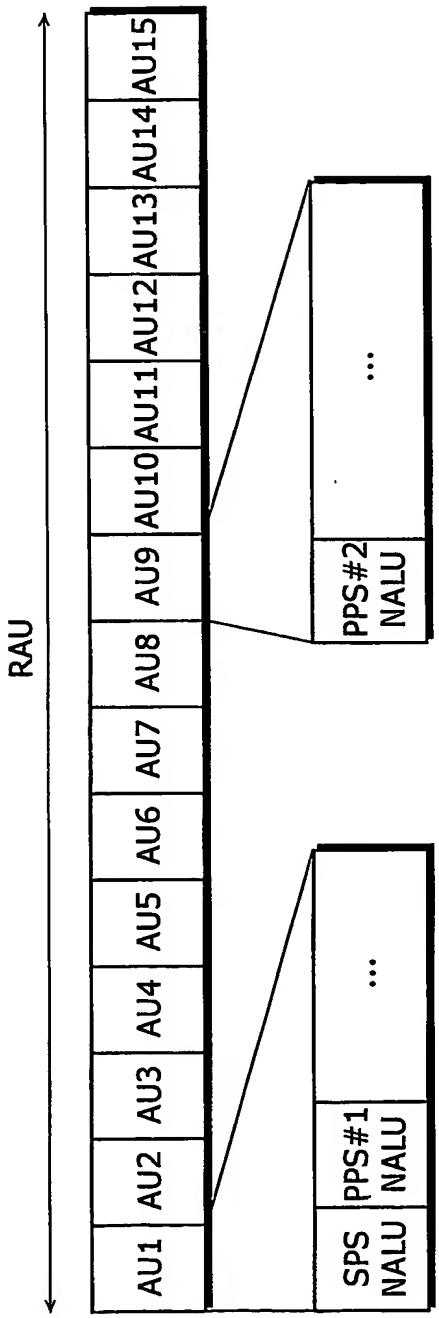


FIG. 7A

RAU

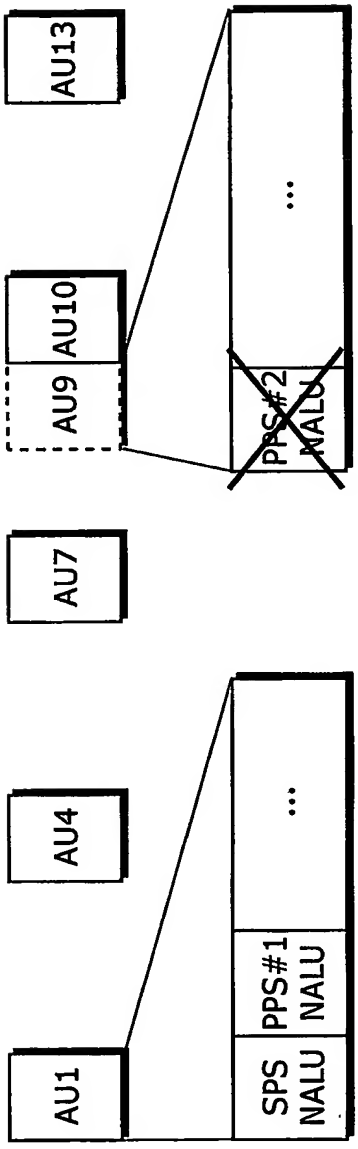


FIG. 7B

AU to be displayed

FIG. 8

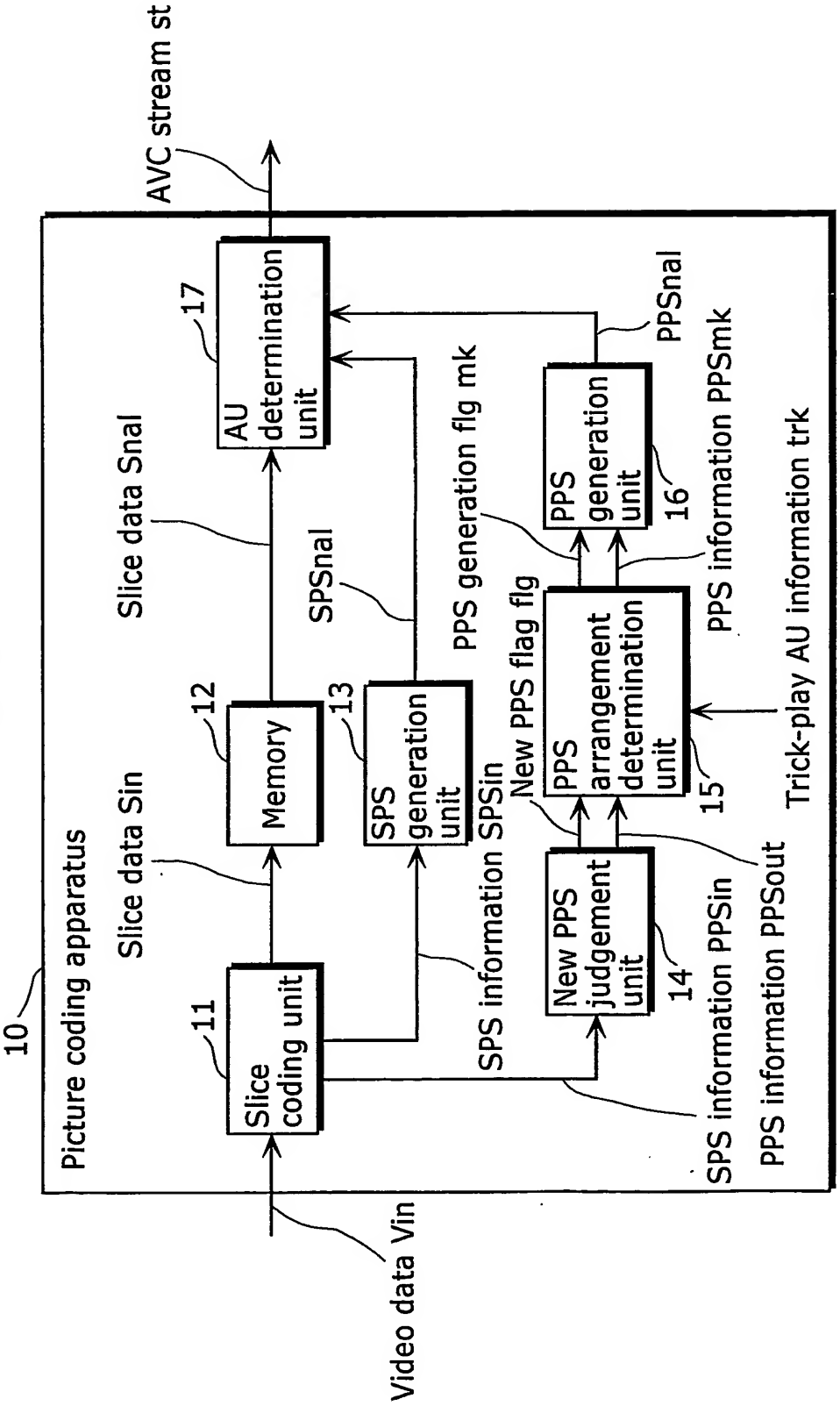

AVC stream st
Picture coding apparatus
10
Slice coding unit
11
Memory
12
SPS generation unit
13
New PPS judgement unit
14
PPS arrangement determination unit
15
PPS generation unit
16
AU determination unit
17
Video data Vin
Slice data Sin
Slice data Snal
SPSnal
SPS information SPSin
SPS information PPSin
New PPS flag flg
PPS generation flg mk
PPS information PPSout
PPS information PPSmk
PPSnal
Trick-play AU information trk

FIG. 9

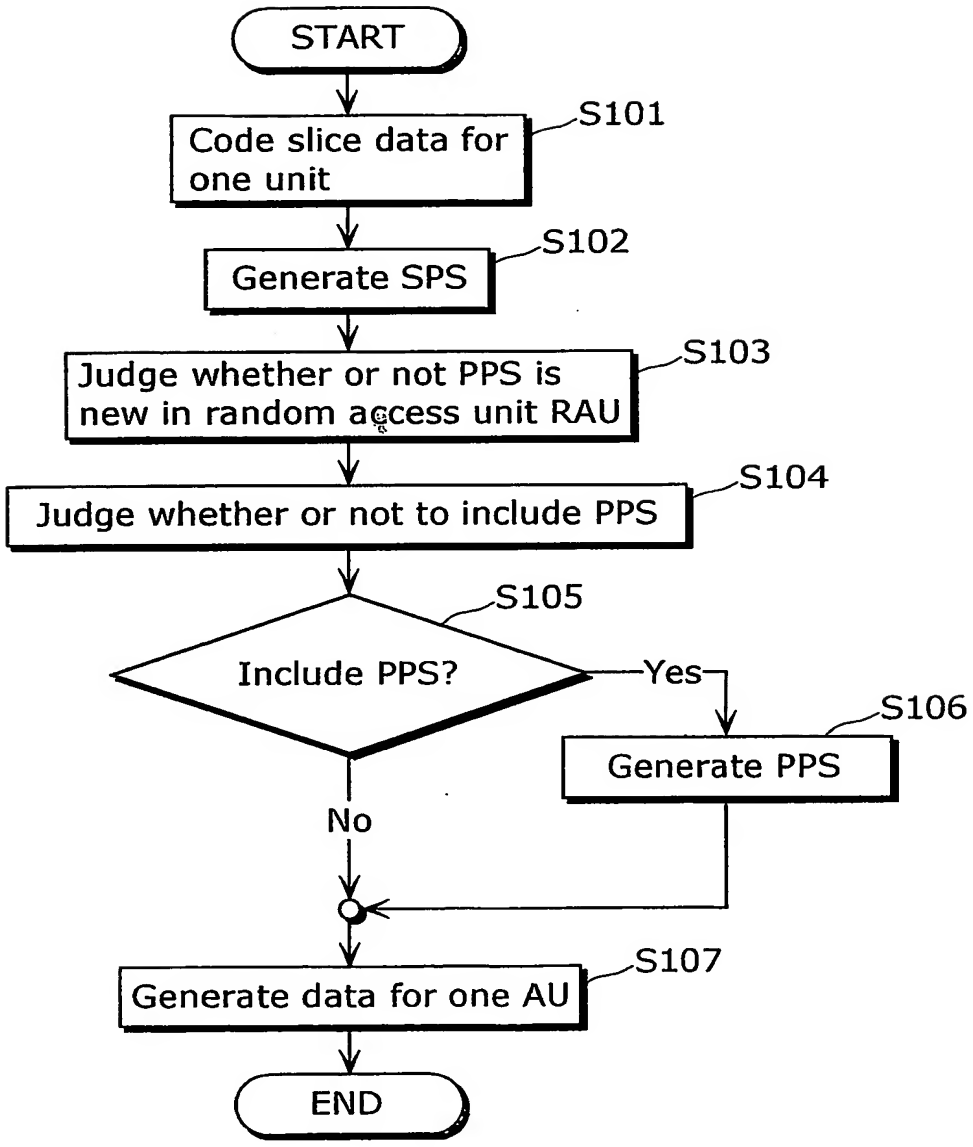
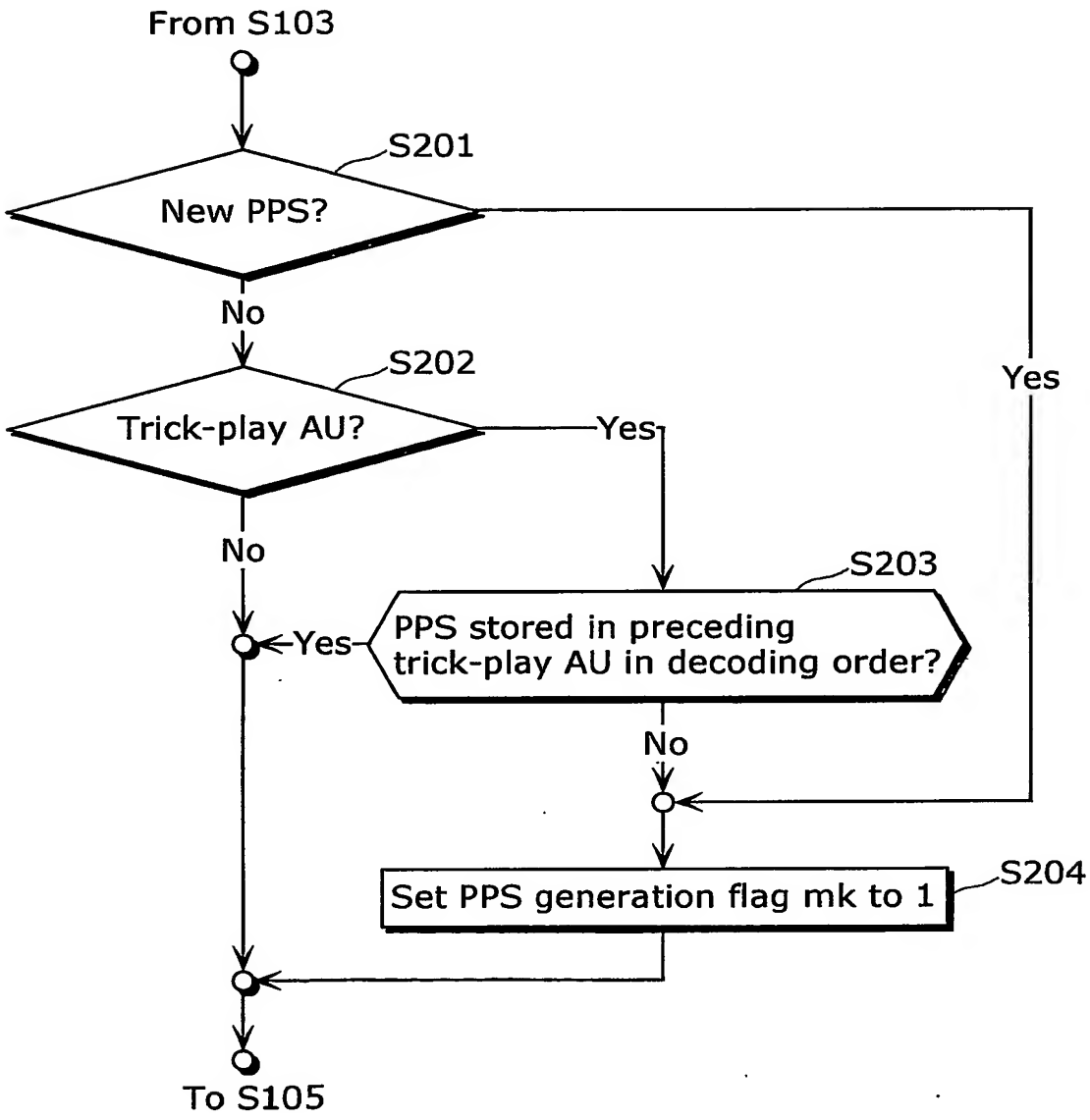

START
Code slice data for one unit
S101
Generate SPS
S102
Judge whether or not PPS is new in random access unit RAU
S103
Judge whether or not to include PPS
S104
Include PPS?
S105
Yes
Generate PPS
S106
No
Generate data for one AU
S107
END

FIG. 10


From S103
S201
New PPS?
No
Yes
S202
Trick-play AU?
Yes
No
S203
Yes
PPS stored in preceding trick-play AU in decoding order?
No
Set PPS generation flag mk to 1
S204
To S105

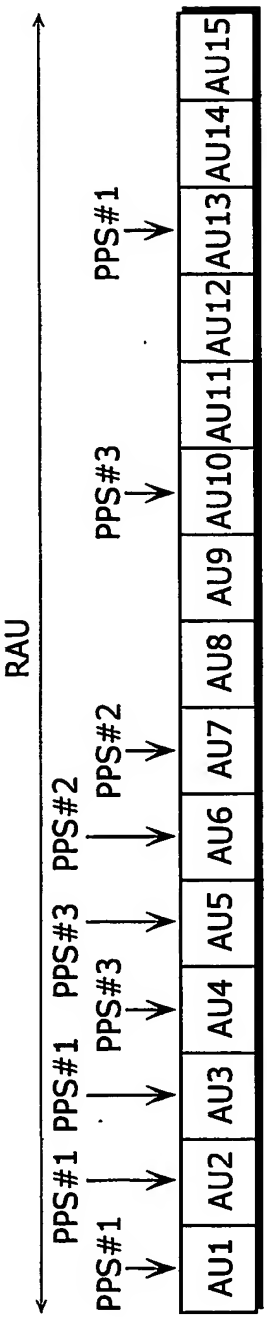


FIG. 11A

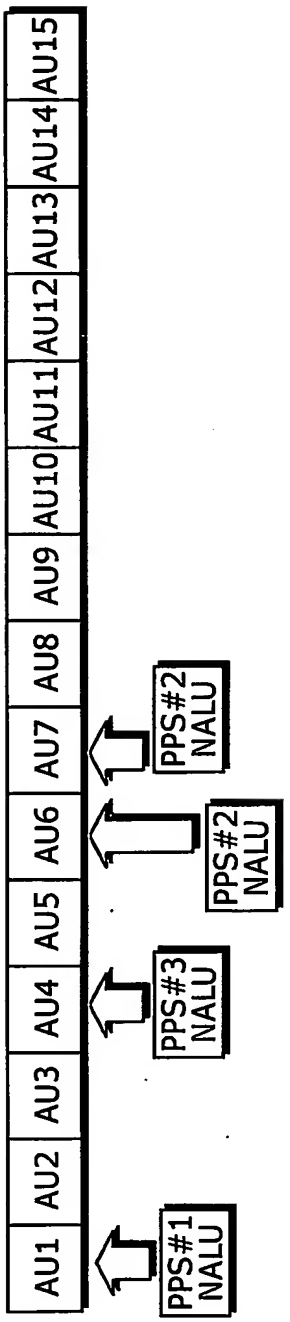


FIG. 11B

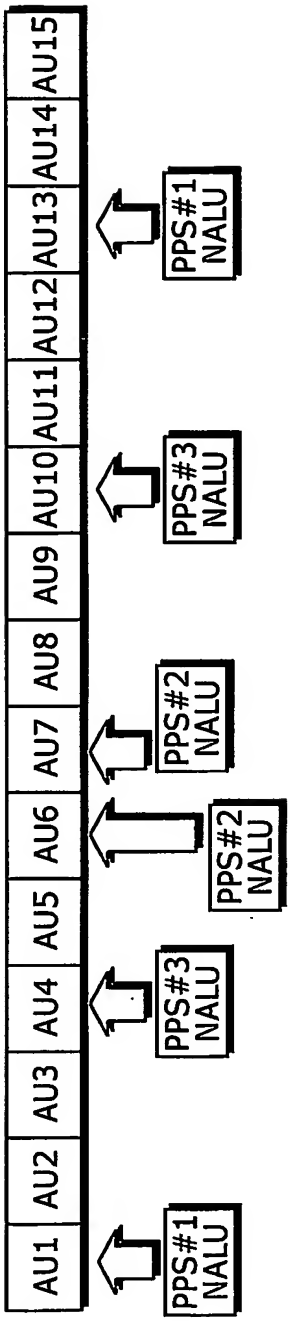
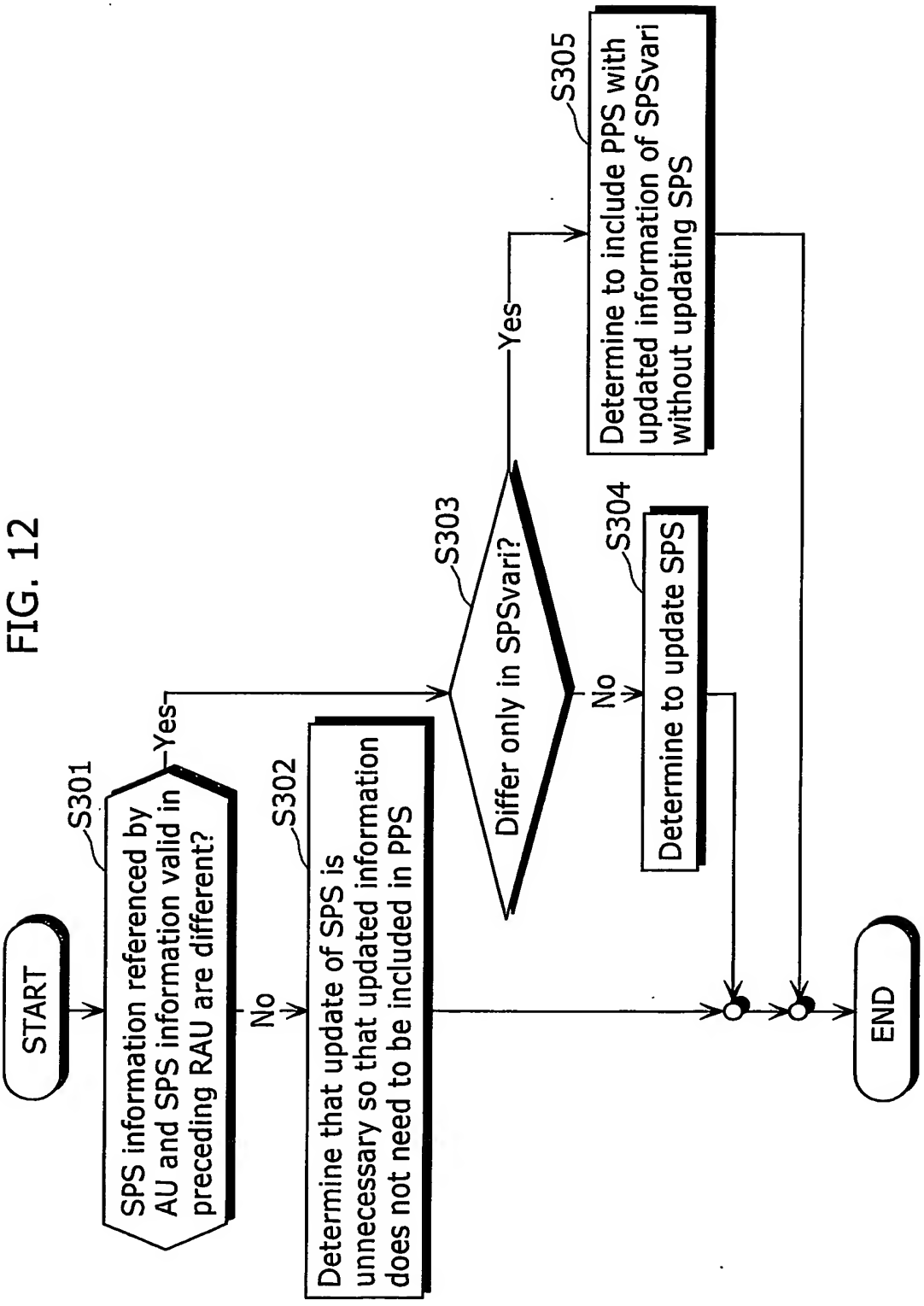


FIG. 11C

FIG. 12


START
S301
SPS information referenced by AU and SPS information valid in preceding RAU are different?
Yes
No
S302
Determine that update of SPS is unnecessary so that updated information does not need to be included in PPS
S303
Differ only in SPSvari?
Yes
No
S304
Determine to update SPS
S305
Determine to include PPS with updated information of SPSvari without updating SPS
END

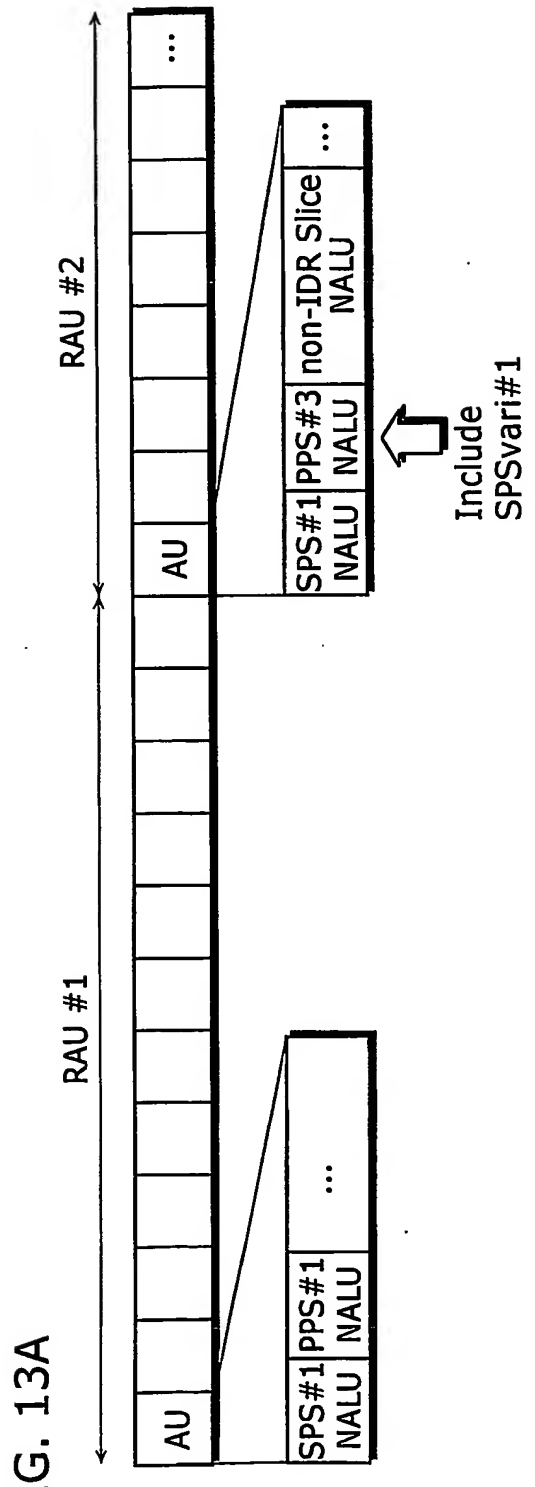


FIG. 13A

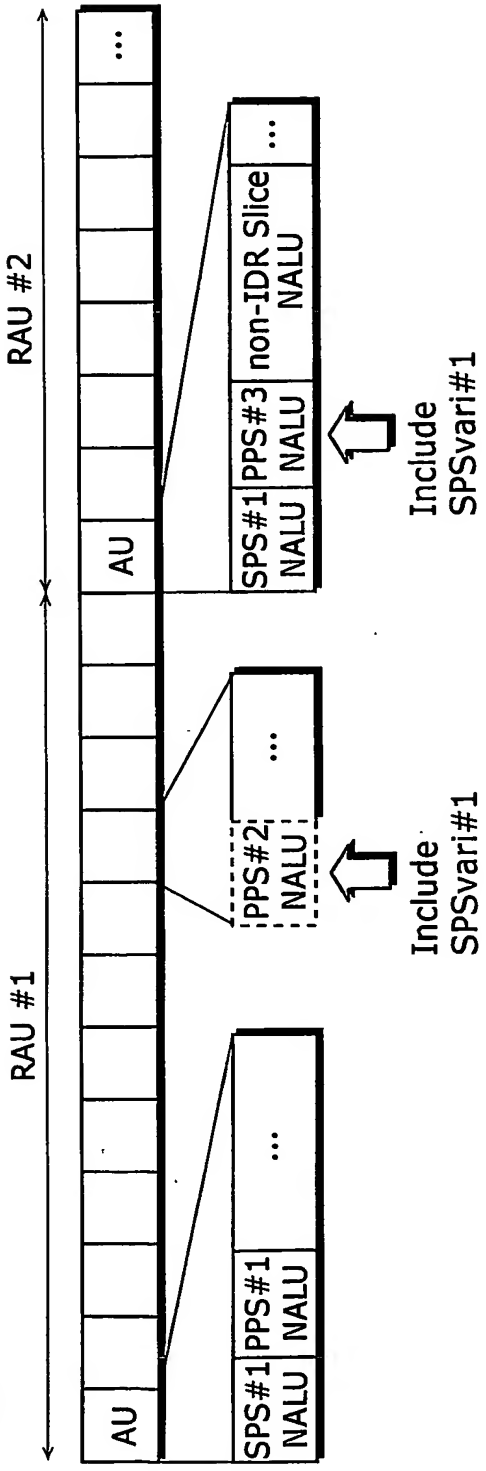


FIG. 13B

FIG. 14

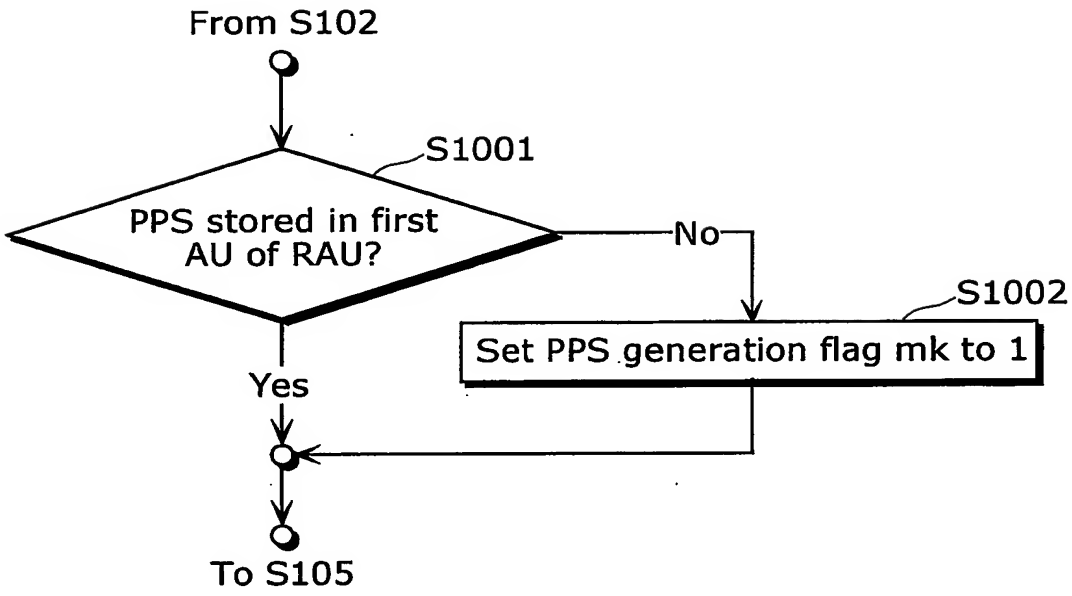

From S102
S1001
PPS stored in first AU of RAU?
No
S1002
Set PPS generation flag mk to 1
Yes
To S105

FIG. 15

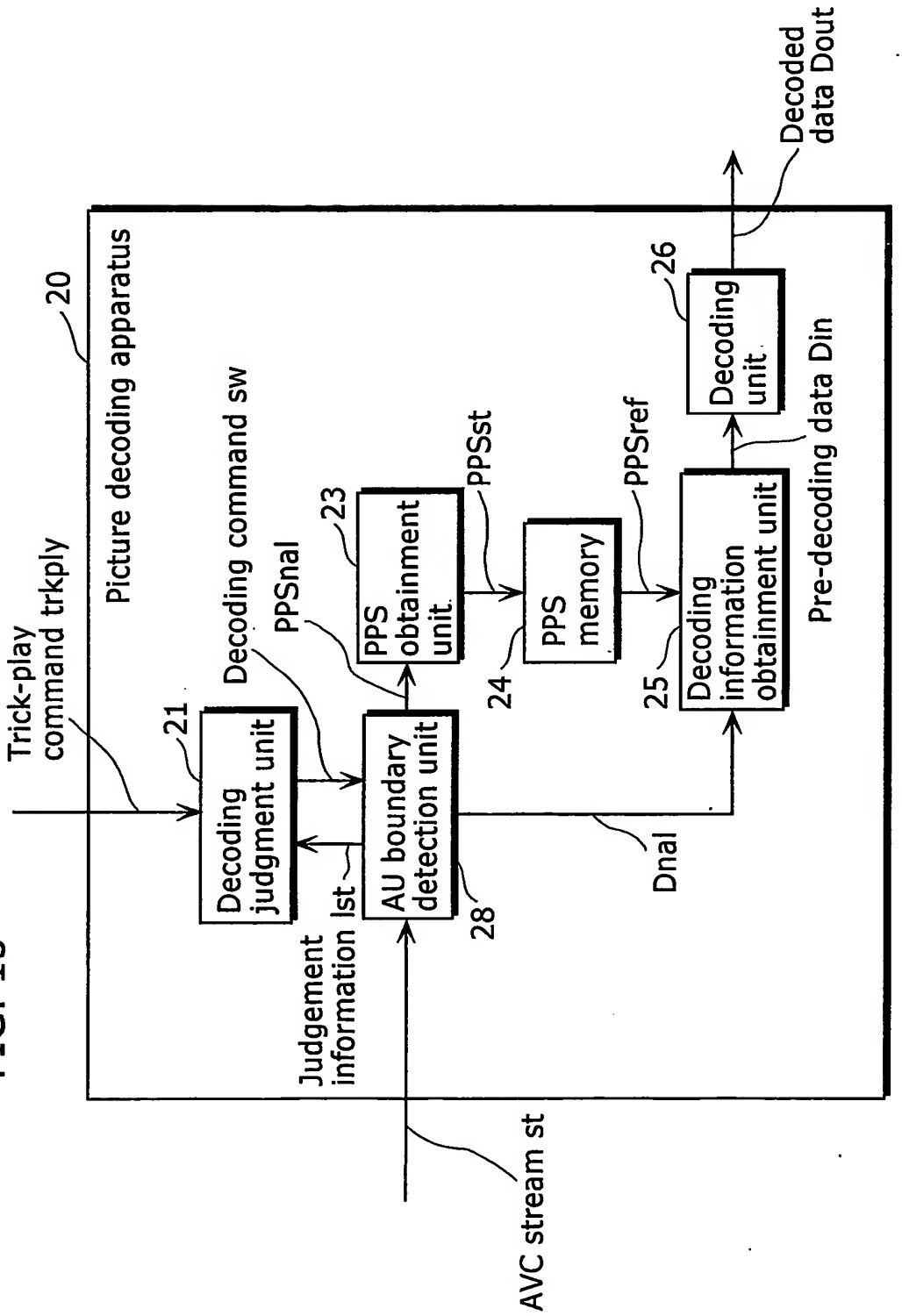

Picture decoding apparatus
20
Trick-play command trkply
Decoding command sw
PPSnal
21
Decoding judgment unit
AU boundary detection unit
28
Judgement information Ist
23
PPS obtainment unit
PPSst
24
PPS memory
PPSref
25
Decoding information obtainment unit
Dnal
26
Decoding unit
Pre-decoding data Din
Decoded data Dout
AVC stream st

FIG. 16

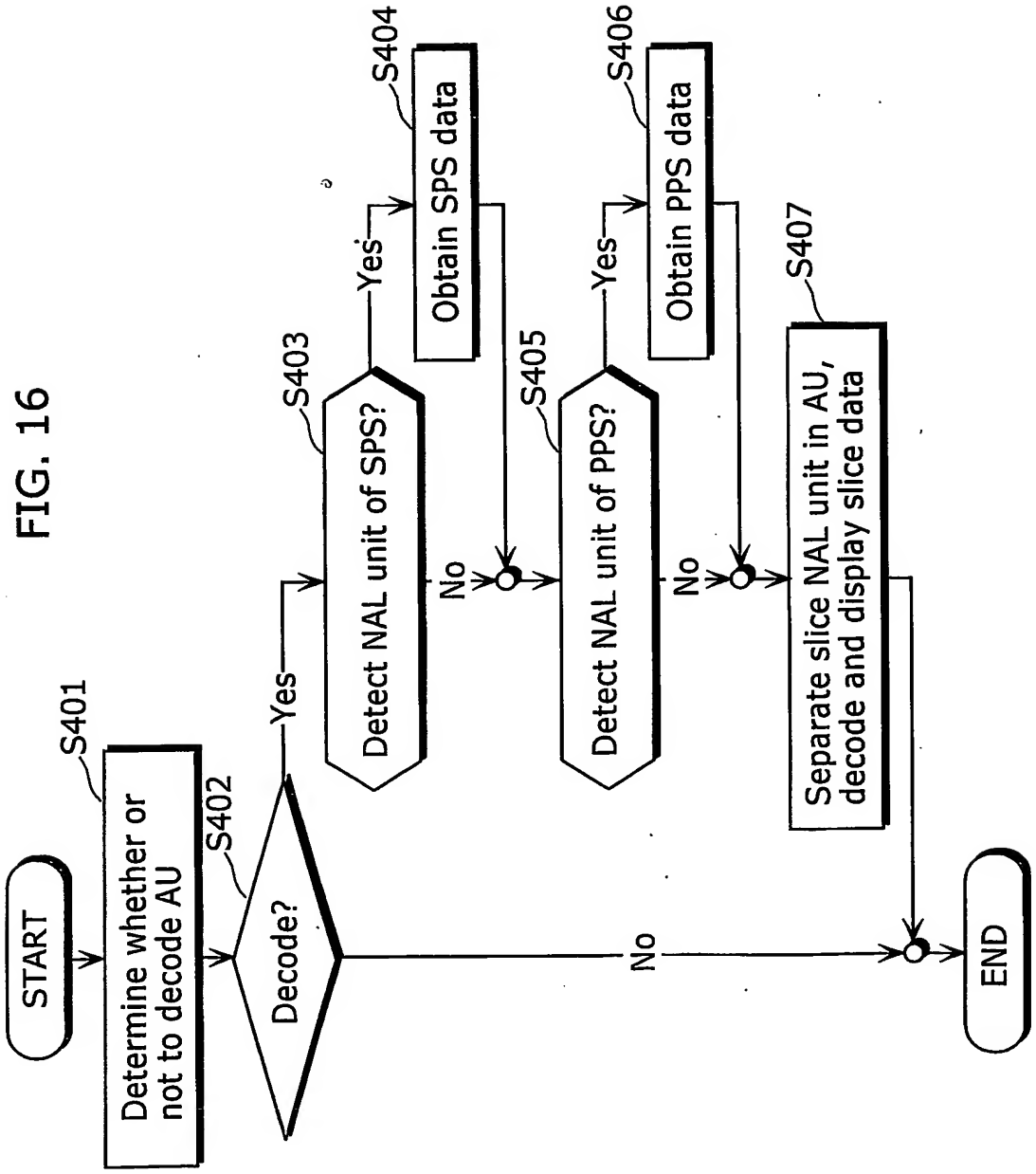

START
Determine whether or not to decode AU
S401
Decode?
S402
Yes
No
Detect NAL unit of SPS?
S403
Yes
No
Obtain SPS data
S404
Detect NAL unit of PPS?
S405
Yes
No
Obtain PPS data
S406
Separate slice NAL unit in AU, decode and display slice data
S407
END

FIG. 17

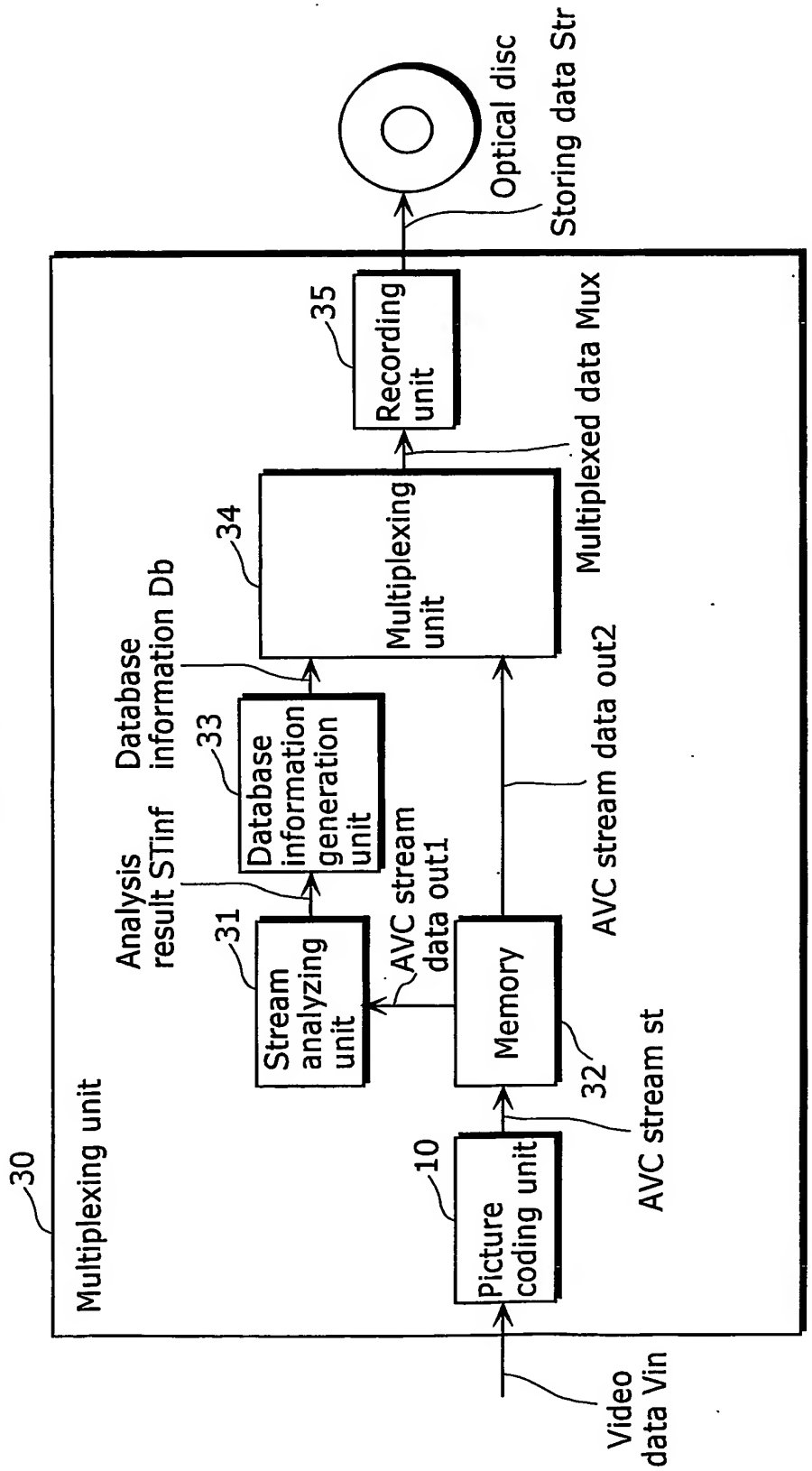

Optical disc
Storing data Str
35
Recording unit
Multiplexed data Mux
34
Multiplexing unit
Database information Db
33
Database information generation unit
Analysis result STinf
31
Stream analyzing unit
AVC stream data out1
AVC stream data out2
Memory
32
AVC stream st
10
Picture coding unit
30
Multiplexing unit
Video data Vin

FIG. 18

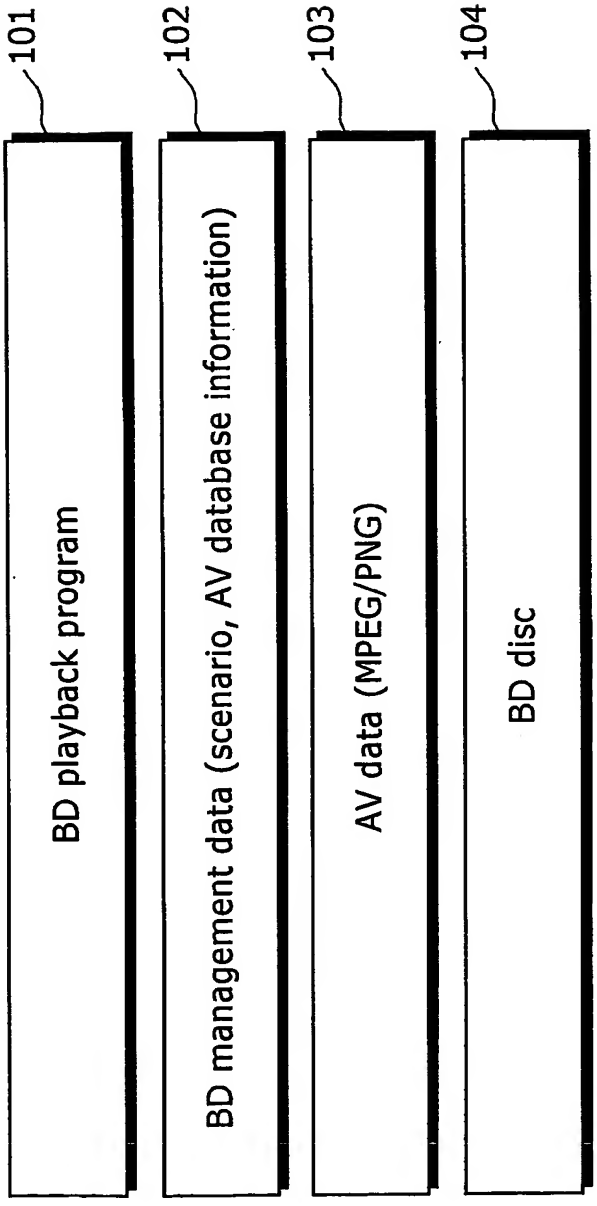

101
BD playback program
102
BD management data (scenario, AV database information)
103
AV data (MPEG/PNG)
104
BD disc

FIG. 19

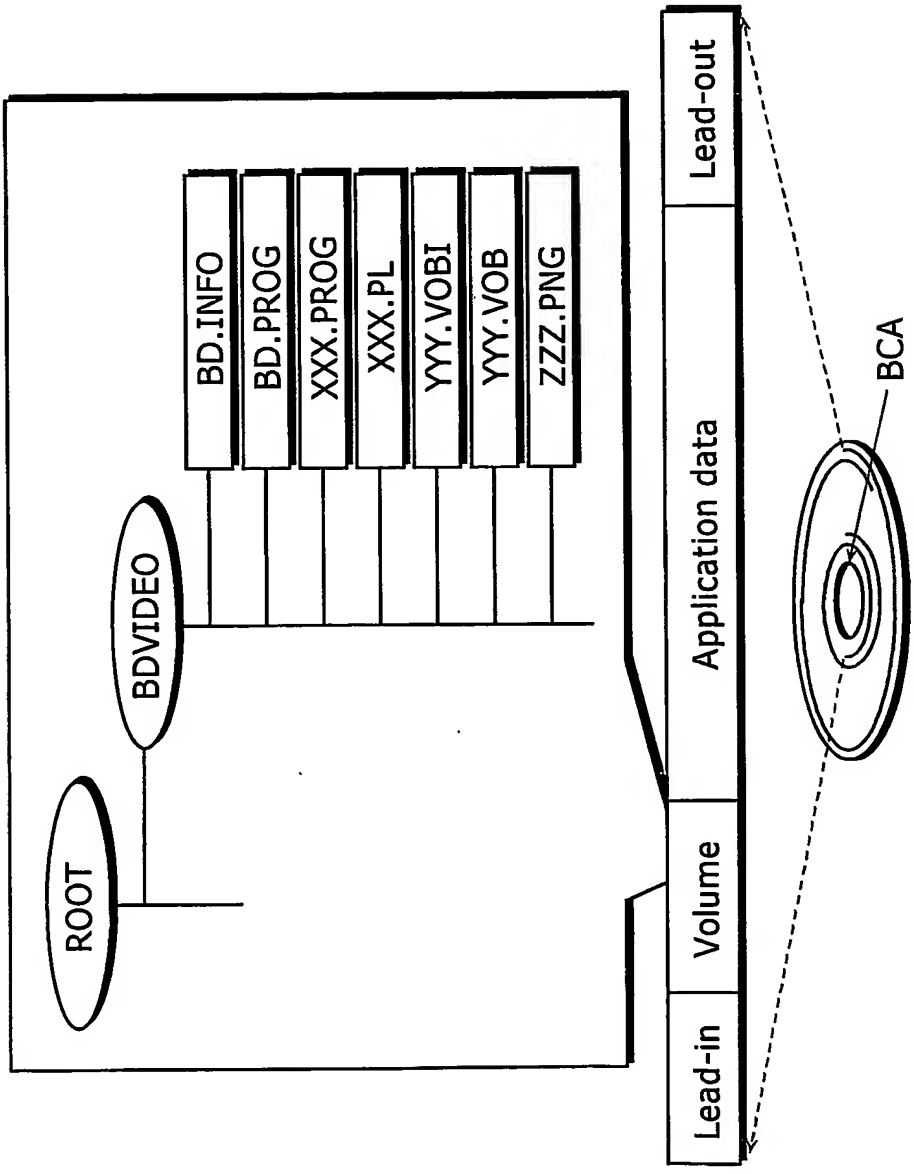

ROOT
BDVIDEO
BD.INFO
BD.PROG
XXX.PROG
XXX.PL
YYY.VOBI
YYY.VOB
ZZZ.PNG
Lead-in
Volume
Application data
Lead-out
BCA

FIG. 20

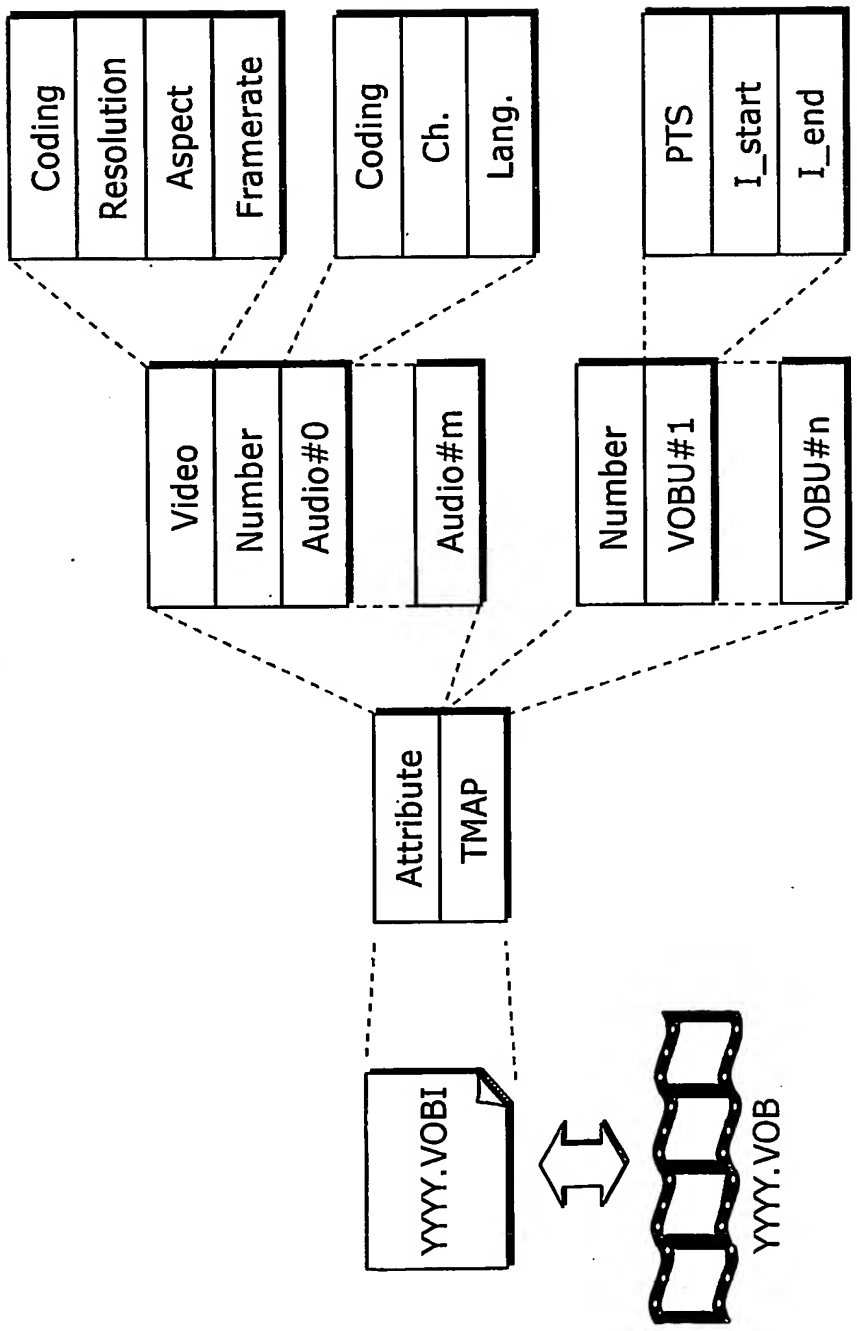
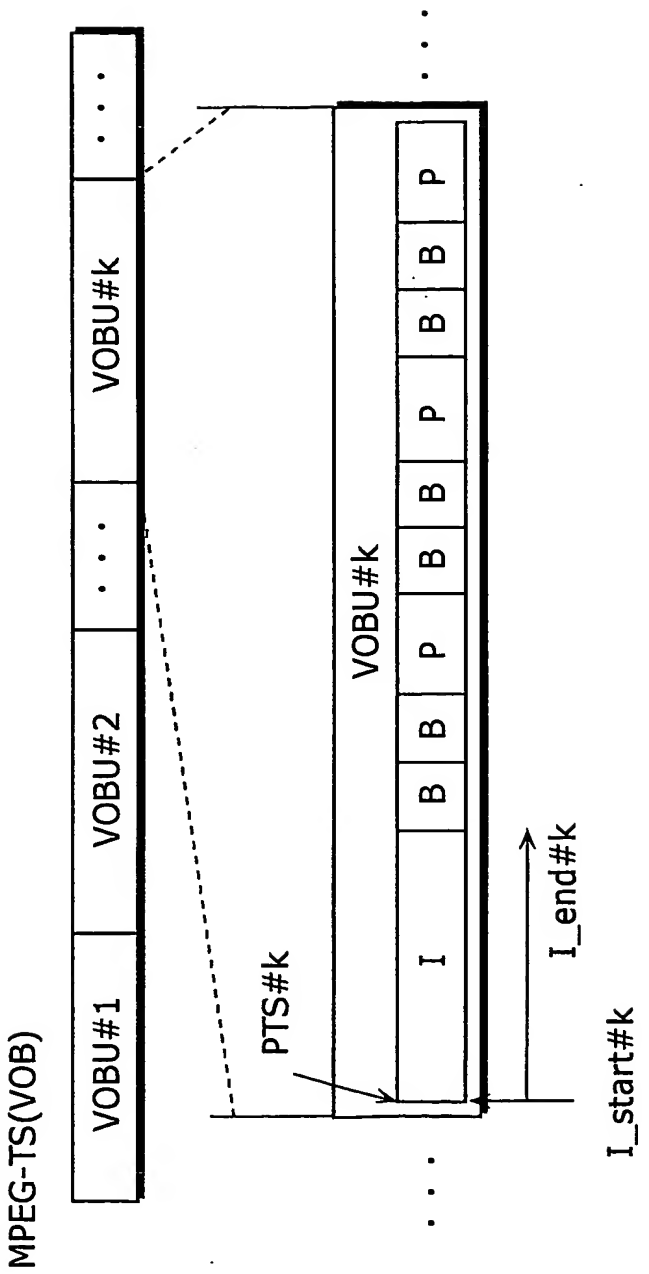

Coding
Resolution
Aspect
Framerate
Coding
Ch.
Lang.
PTS
I_start
I_end
Video
Number
Audio#0
Audio#m
Number
VOBU#1
VOBU#n
Attribute
TMAP
YYYY.VOBI
YYYY.VOB

FIG. 21


MPEG-TS(VOB)
VOBU#1
VOBU#2
VOBU#k
PTS#k
VOBU#k
I
B
B
P
B
B
P
B
B
P
I_end#k
I_start#k

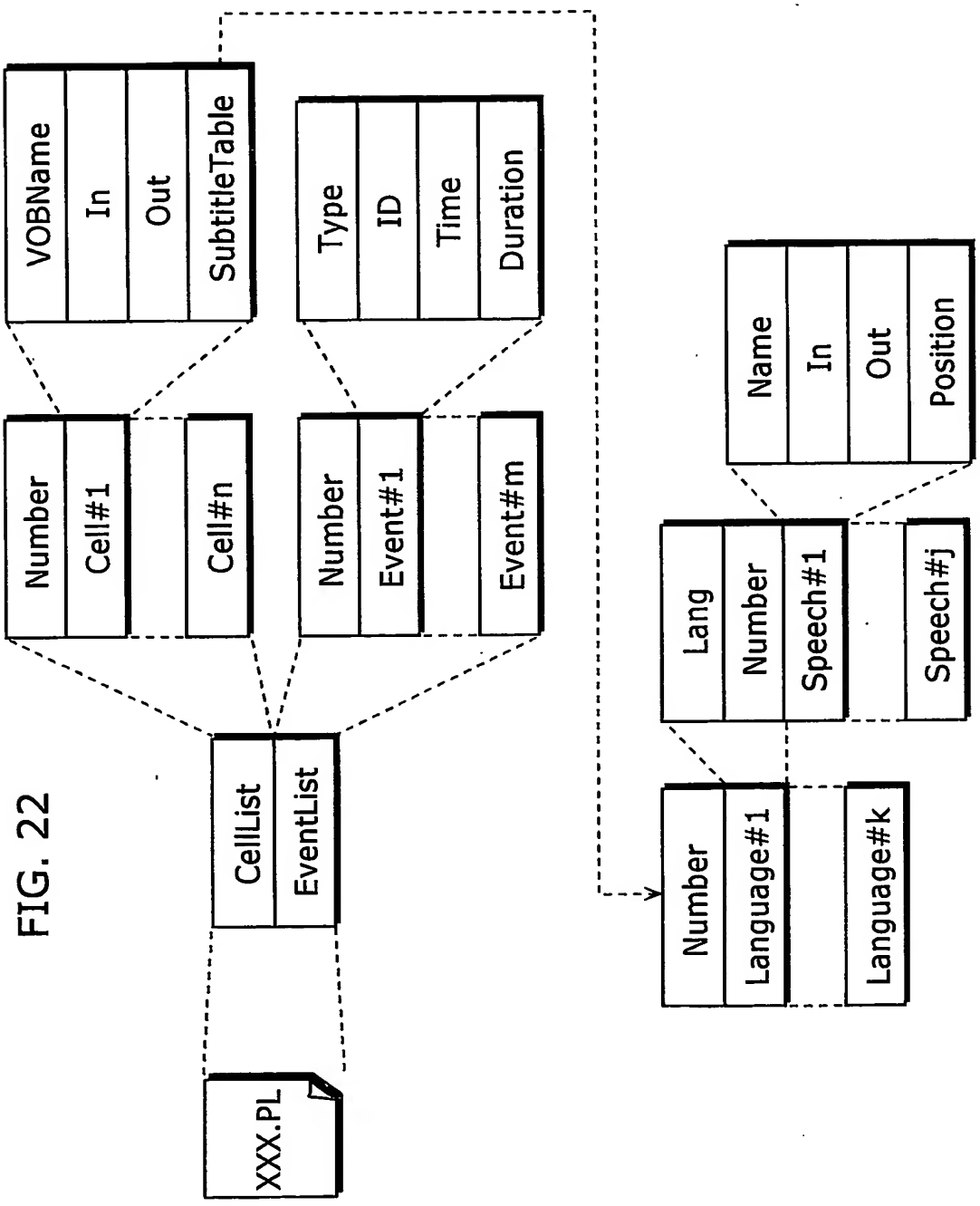

XXX.PL
CellList
EventList
Number
Cell#1
Cell#n
VOBName
In
Out
SubtitleTable
Number
Event#1
Event#m
Type
ID
Time
Duration
Number
Language#1
Language#k
Lang
Number
Speech#1
Speech#j
Name
In
Out
Position

FIG. 22

FIG. 23

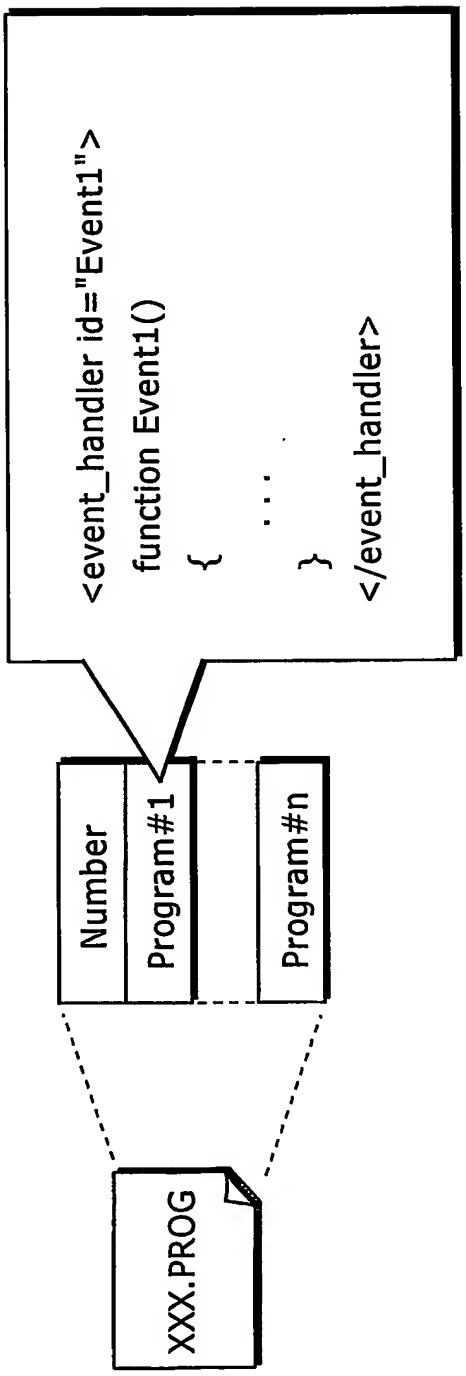

<event_handler id="Event1">
function Event1()
{
. . .
}
</event_handler>
Number
Program#1
Program#n
XXX.PROG

FIG. 24

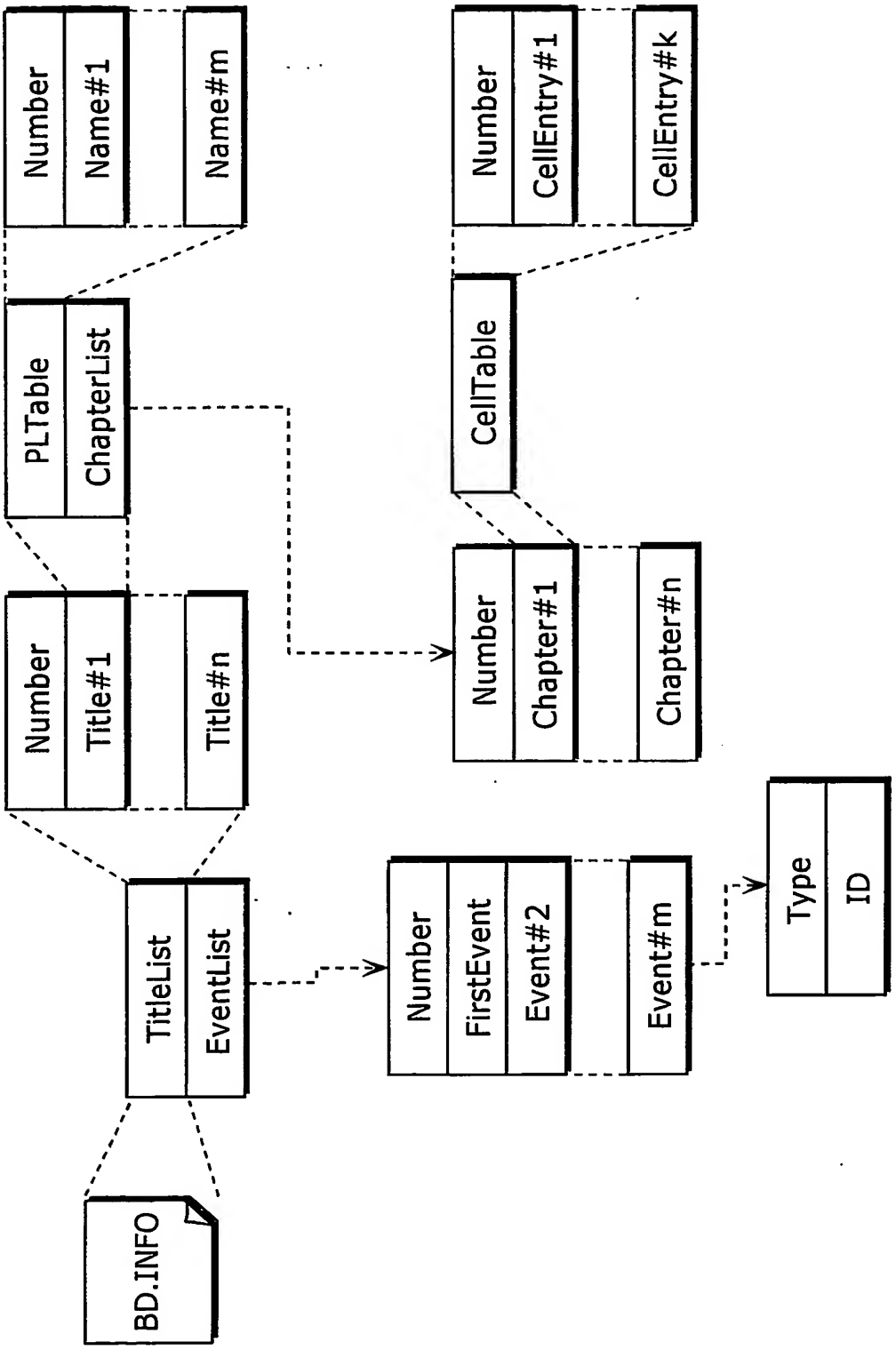

Number
Name#1
Name#m
PLTable
ChapterList
Number
Title#1
Title#n
TitleList
EventList
BD.INFO
Number
CellEntry#1
CellEntry#k
CellTable
Number
Chapter#1
Chapter#n
Number
FirstEvent
Event#2
Event#m
Type
ID

FIG. 25

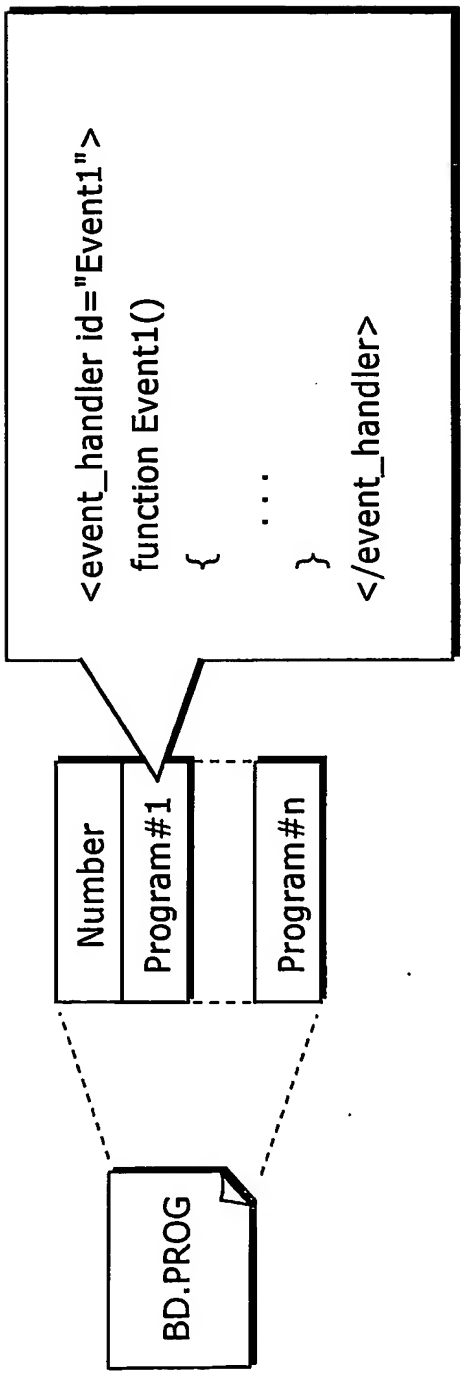

<event_handler id="Event1">
function Event1()
{
...
}
</event_handler>
Number
Program#1
Program#n
BD.PROG

FIG. 26

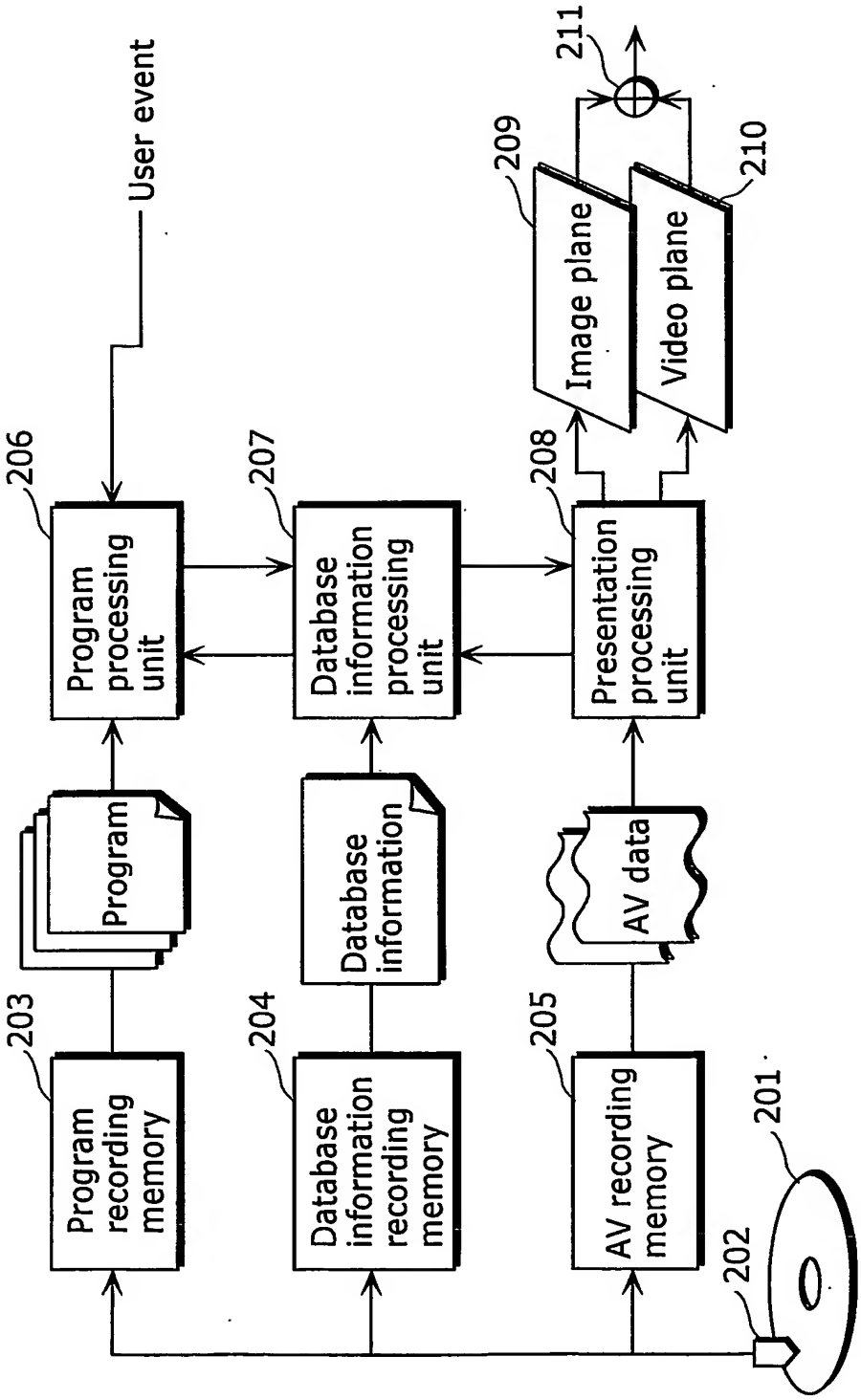

User event
211
209
210
Image plane
Video plane
206
207
208
Program processing unit
Database information processing unit
Presentation processing unit
Program
Database information
AV data
203
204
205
Program recording memory
Database information recording memory
AV recording memory
201
202

Fig. 27A

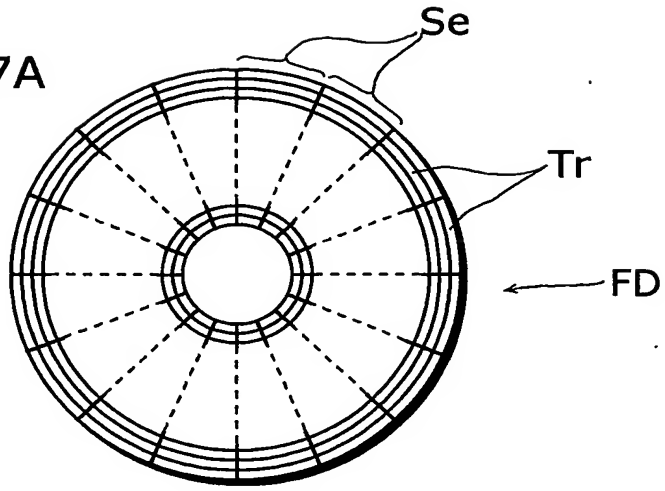


Fig. 27B

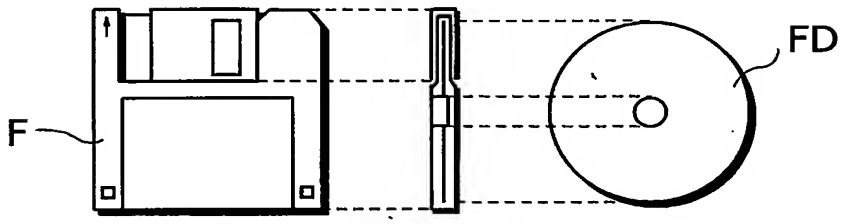
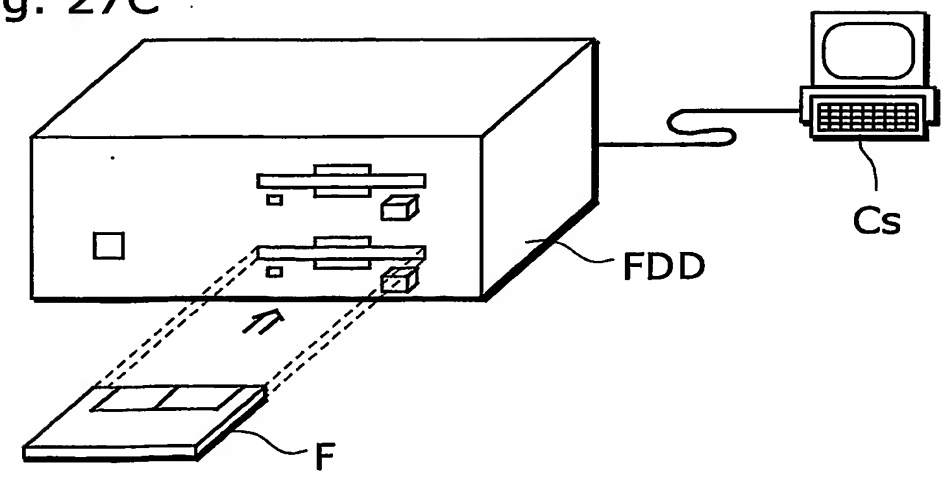



Fig. 27C